

REMARKS

Claims 1-15 were originally pending in the application. The present Amendment cancels claim 6, and incorporates the features formerly found therein into claims 1 and 15.

Applicant appreciates the telephone interview granted by the Examiner on January 30, 2009, conducted with Applicant's representative. The Interview Summary issued on February 3, 2009 contains an accurate summary of the substance of the interview. Applicant further adds that the Examiner was willing to accept the affidavit referred to in the Interview Summary, even though the present application is under Final Rejection. Thus, Applicant respectfully requests entry and consideration of the present Amendment, at least for purposes of putting the application in better condition for appeal. No amendments are included which would require further search, since features added to claims 1 and 15 were previously found in claim 6.

Claims 1, 3, 6, and 13-15 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 3,894,572, to Moore, Jr., hereinafter "Moore." Claims 1 and 15 are independent. Claim 6 has been cancelled.

Claim 1 recites a process for the production of a shell mould. The process comprises the steps of dipping a preformed expendable pattern into a slurry of refractory particles and colloidal liquid binder whereby to form a coating layer on the pattern, depositing particles of refractory material onto the coating, and drying. These steps are repeated as often as required to produce a shell mould having the required number of steps. During at least one performance of the depositing step, the particles of refractory material are pre-mixed with a gel-forming material to coat at least a portion of the refractory materials with the gel-forming material. After contact with the coating layer, moisture is absorbed by the gel-forming material, causing gellation of the colloidal binder, which reduces the time required for drying. The gel-forming material is a superabsorbent polymer.

Moore discloses a process for forming a refractory laminate on the surface of a support structure. The process comprises the steps of dipping the structure into a bath of positively charged colloidal particles to form a coating on the surface, and applying the surface to a particulate refractory material containing a chemical setting agent. (Abstract) The coating containing the positively charged colloidal particles is "stuccoed" by interaction with the refractory material containing the setting agent. (col. 3, l. 19-22) The chemical setting agent can comprise homopolymers and copolymers of acrylic acid and methacrylic acid. (col. 10, l. 16-18)

The Office Action states, on p. 4, that Moore discloses a solid setting agent that "possesses certain degree [sic] of moisture absorption property though the degree of the absorption may be different from that of the instant gel-forming material." Applicant respectfully submits that this statement has no basis in Moore. Moore does not state anywhere that the chemical setting agents disclosed therein have any moisture absorption properties.

Even if the Office Action's statement that Moore discloses polymers having a certain degree of moisture absorption were true, however, claim 1 recites a superabsorbent polymer, which is not disclosed or suggested by Moore. In support of this assertion, Applicant submits the attached declaration from inventor Samantha Jones, hereinafter the "Jones declaration." As stated in the Jones declaration, superabsorbent polymers are known as defining a specific class of polymers that have specific structures, and specific properties. For example, superabsorbent polymers have a cross-linked, ionic, and interconnected structure that allows them to absorb large amounts of water. (Jones declaration, ¶8) The polymers cited in Moore are not superabsorbent.

The essential difference between the superabsorbent polymers of the present claims, and the polymers disclosed in Moore, is that the polymers of Moore are not cross-linked. (Jones declaration, ¶9) As mentioned in the Buchholz article attached to

the Jones declaration, the cross-linked, interconnected structure of a superabsorbent polymer is essential to its ability to absorb moisture. The moisture is held as a gel in a "solid, rubbery state" which prevents the moisture from leaking. (Jones declaration, ¶8)

The only mention of cross-linking in Moore is between the colloidal particles, and not within the polymer setting agent itself. (Moore, col. 8, l. 39-41) This cross-linking is a result of the chemical interaction between the setting agent and the colloidal particles. In the superabsorbent polymers of claim 1, the cross-linking is within the polymer itself. (Jones declaration, ¶9)

Furthermore, the chemical setting agents used in Moore are chosen for their high anionic density, which results in strong interaction between the anionic portions of the polymers, and the positively charged sol particles. (Jones declaration, ¶10, *citing* Moore, col. 8, l. 34-41) Cross-linking does not provide any additional anionic functionality, and would therefore not add any value to the polymer setting agents of Moore. (Jones declaration, ¶11) There is no disclosure in Moore of cross-linking between the chains of a polymer, no teaching of a need for the polymer setting agent to absorb moisture, or a discussion of the ability of the polymer setting agents to do so, as required in the present claims.

Therefore, one of ordinary skill in the art would not have any reason to read Moore as disclosing cross-linked polymers, such as the superabsorbent polymer of claim 1, because cross-linking would not be needed in the process disclosed in therein, nor would an ability to absorb moisture. Since Moore fails to disclose or suggest superabsorbent polymers, it fails to anticipate claim 1.

Claim 1 is therefore patentable over Moore under 35 U.S.C. §102(b). Claims 3, 6, 13, and 14 all depend from claim 1, and are also patentable over Moore for at least the reasons provided above with respect to claim 1.

Claim 15 recites, *inter alia*, a superabsorbent polymer that absorbs moisture to

cause gellation of a colloidal binder. As stated above with respect to claim 1, Moore fails to disclose or suggest such a feature. Claim 15 is therefore also patentable over Moore under 35 U.S.C. §102(b).

For the reasons discussed above, the rejection of claims 1, 3, 6, and 13-15 under 35 U.S.C. §102(b) as being anticipated by Moore has been overcome. Applicant respectfully requests that it be reconsidered and withdrawn.

Claims 2, 4, 5, and 7-12 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Moore. These claims all depend from claim 1. United States Patent Nos. 4,204,872, to Hayati et al., and 4,223,716, to Ostrowski are cited for additional support.

As previously discussed, claim 6 was cancelled, and incorporated into claims 1 and 15. Claim 6 was not part of the present rejection, so the rejection is rendered moot. Hayati and Ostrowski fail to cure the deficiency of Moore to disclose or suggest a superabsorbent polymer, and are not relied on by the Office Action to do so.

Therefore, for at least the reasons provided above in support of the patentability of claim 1, claims 2, 4, 5, and 7-12 are also patentable over Moore. Applicant respectfully requests that this rejection be reconsidered and withdrawn.

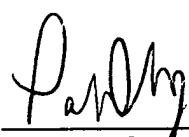
Claims 1-15 have been provisionally rejected under co-pending United States Application No. 10/523,855, in view of Moore. Applicant respectfully submits that the terminal disclaimer attached in Exhibit 1 overcomes this rejection, and requests that it be withdrawn.

An indication of the allowability of all pending claims by issuance of a Notice of Allowance is earnestly solicited.

If for any reason the Examiner feels that consultation with Applicants'/ Applicant's attorney would be helpful in the advancement of the prosecution, the Examiner is invited to call the telephone number below.

Respectfully submitted,

Date: 4/13/09



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EXHIBIT 1



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:

Jones

Serial No.:

10/587,425

For:

IMPROVED INVESTMENT CASTING PROCESS

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Commissioner for Patents
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DECLARATION UNDER 37 C.F.R. 1.132

Dear Sir:

1. I, Samantha Jones, hereby declare and state the following:
2. I am a citizen of the United Kingdom. I reside at 121 Upper Ettingshall Road, Coseley, Bilston, West Midlands, UK.
3. I have a degree in Material Science from the University of Bath, received in 1988, and a Ph. D. from the University of Birmingham, received in 1992. I have been continuously employed by the University of Birmingham since September 1992, in the

School of Metallurgy and Materials, working in the field of investment casting research. My current position is Research Fellow, working on research and development of gamma titanium aluminide alloy investment casting.

4. I am the sole inventor of the subject matter of the above-identified patent application.

5. As a person having ordinary skill in the art of investment casting, I have reviewed United States Patent No. 3,894,572, to Moore, Jr., hereinafter "Moore." It is my opinion Moore does not disclose or suggest each and every feature of the claimed invention.

6. Moore does not disclose gel-forming materials that are superabsorbent polymers, which are required in the claims of the present application. There is no mention of these polymers anywhere within the reference.

7. The article attached in Exhibit 1 of this declaration, "Superabsorbent Polymers: An Idea Whose Time Has Come," by Fredric L. Buchholz, was printed in the Journal of Chemical Education, and is dated from 1996. This journal is an educational text.

8. As stated in the opening paragraph of the Buchholz article, superabsorbent polymers are cross-linked polyelectrolytes that, due to their ionic nature and interconnected structure, absorb large quantities of water and other aqueous solutions without dissolving. As stated at the bottom of the first column of p. 512, the polymer forms a gel, and holds the moisture in a "solid, rubbery state." The liquid is thus held within the polymer structure, and is prevented from leaking.

9. Moore does not mention at all that the polymers used for the chemical setting agents discussed therein show any degree of cross-linking, and therefore does not disclose superabsorbent polymers. The only discussion of cross-linking anywhere in

Moore is between the colloidal particles, and not within the setting agent polymers themselves. (col. 8, l. 34-41) From this, it is clear that any cross-linking that occurs in Moore is a result of the reaction between the setting agent and the colloidal particles. This is in contrast to the superabsorbent polymer of the present claims, which has a cross-linked structure within the polymer itself.

10. One of ordinary skill in the art would have no reason to believe that Moore discloses superabsorbent polymers, i.e. polymers that are cross-linked. The polymers of Moore are disclosed as "polyfunctional organic acids." These polymers are chosen because of their polyanionic characteristics, and high anionic density. These polyanionic polymers react strongly with the positively charged colloidal particles, which enhances the chemical setting process so important to Moore. (col. 8, l. 34 – 41)

11. Cross-linked polymers, by contrast, such as the superabsorbent polymers of the present application, provide no additional anionic function. They would therefore be of no use to Moore, since the process disclosed therein is so dependent on the interaction between the anionic groups of the polymer and the colloidal particles. Moore would therefore provide no guidance for one looking to develop the process of the present application, which requires an absorption of moisture by the gel-forming superabsorbent polymer.

I hereby declare that all statements made herein of my own knowledge are true and all statements made on information and beliefs are believed to be true. I further declare that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,

Dated: 6/4/2009

By: S. Jones
Samantha Jones
Research Fellow

EXHIBIT 1